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ABSTRACT

This study profiled the pre-entry attributes, first year academic performance, and institutional experience of a 1995 freshman cohort who graduated within 6 years in a 4-year public college in a medium-sized city. A sample of 1,175 students formed the cohort for the study. Factors were found that distinguished the graduated and nongraduated. In terms of pre-entry attributes, these factors included: gender, age, high school average, entering college in the year of high school graduation. In terms of first-year academic performance, the factors included: first semester registered hours, first-year grades, remedial courses taken, and number of failed courses. Institutional experience, such as being admitted under a special program, also differed for graduates and nongraduates. The first-year academic performance was found as the major player in bachelor's degree persistence. The study also compared the graduates with those who did not graduate within 6 years, but remained enrolled. Those who were still enrolled had in common that they took their own pace toward graduation. (Contains 1 chart, 5 tables, and 13 references.) (Author/SLD)

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HOW THE FIRST-YEAR COLLEGE EXPERIENCE CONTRIBUTES TO PERSISTENCE

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HOW THE FIRST-YEAR COLLEGE EXPERIENCE CONTRIBUTES TO PERSISTENCE

This study profiles the pre-entry attributes, first year academic performance, and institutional experience of a 1995 freshman cohort who graduated within six years in a four-year, public college located in a medium sized city. Factors in areas of pre-entry attributes (e.g. gender, age, high school average, entering college at the same year as high school graduate), first-year academic performance (e.g. first semester registered hours, first year grades, took remedial courses, number of failed courses), and institutional experience (e.g. admitted as EOP student) are found that distinguish graduated from non-graduated. The first-year academic performance is found as the major player in the bachelor degree persistence. The study also compared the graduated students to those who did not graduate within six years but still enrolled.

HOW THE FIRST-YEAR COLLEGE EXPERIENCE CONTRIBUTES TO PERSISTENCE

Introduction

This study is to examine the pre-entry attributes, first-year academic performance, and institutional experience of the 1995 freshman cohort that graduated in no more than six years from a four-year public college located in a medium-sized metropolitan city. Research has found that promoting student success in the first year is vital because approximately three-fourths of all dropouts leave during the first year (Tinto, 1993). During the 1990s in this college, on average, more than 20% of the freshmen did not return after their first year of study. Meanwhile, cumulatively, only about 38% of the students graduated with a bachelor's degree from the college by the end of the sixth year. The high rate of first year attrition and the lower rate of graduation have direct impact on the cost productivity of the college and, therefore, has concerned the college administration for years.

The departure issue has been the object of empirical inquiry for decades. Despite the growing body of research focusing on the validity of Tinto's model of 1975, the model offers the theory of college students' departure and provides a potentially useful framework for understanding the complex process of student persistence (Pascarella & Chapman, 1983). Tinto's theory (1975, 1987) argues that personal attributes and background characteristics lead to varying levels of initial commitment to the goal of college education. Once a student enrolls in an institution, the initial commitments interact with the academic and social components of the institution, resulting in different levels of academic and social integration as well as college persistence. In recent years, the model has been questioned by scholars for its lack of empirical internal consistency (Braxton, 2000; Braxton, Sullivan, and Johnson, 1997) and the aggregated support or support by institutional type (Milem and Berger, 1997; Cabrera, Nora, and Castaneda, 1993). While researchers are reinvigorating Tinto's model through empirical affirmation, this study employed the logic of integration of the model to study college persistence from three aspects, namely the pre-entry attributes, first-year academic performance, and institutional experience. Persistence is largely regarded as an outcome of the student's interactions with the social and academic systems of the institution (Pascarella & Terenzini, 1983).

The study attempted to answer two questions of great concern: (1) What are the factors that differentiate graduated and not-graduated groups? (2) Do these factors contribute to college degree persistency at statistically significant levels?

Methodology

Data Source and Sample

The study used 1995-2000 student data and 1998-2000 degree data of the college. Students who were first-time, full-time freshmen enrolled in fall 1995 were followed through the end of academic year 2000. A sample of 1,175 students formed the cohort for this study.

Measurement

Graduated/Not-Graduated. In this study, students who obtained their bachelor degrees within six-year period from college were identified as graduated; otherwise, not-graduated.

Students who were temporarily out of the school after the first year but still managed to receive their college degrees belong to the graduated group (n=5). The status of neither still enrolled for the seventh year nor transferred to other schools is used as a criterion for the identification.

Variables for Pre-Entry and First-Year Experience. The comparison between the graduated group and the not-graduated group was made on three sets of factors. The first set consists of the pre-entry attributes, such as age, ethnicity, gender, higher school average, total SAT scores, and if entering college in the same year of high school graduation. The second set is about first-year academic performance. It refers to the number of registered credit hours, the number of remedial courses taken, the number of failed courses, and the first year GPA. The third set, or the institutional experience, includes commitment to an academic major in the first year, participation in a special program (i.e. EOP), and dormitory residency status. Unless specified, all the variables were used in their original format.

Methods of Analysis

Frequency distribution with Chi-square was used to identify the factors by which the graduated group was significantly different from the not-graduated group. Then, Pearson correlation analysis helped to select the components to form a regression model for a hypothesis test. Logistic analysis was performed based on the dichotomous nature of the dependent variable. Three logistic models were set up to test if any factors from each set of the independent variables, pre-entry attributes, first year academic performance, or institutional experience, significantly contributed to the pursuit of a college degree. The probability of rejecting a hypothesis is set at 0.05.

Results and Discussion

Among the 1,175 students in the cohort of the study, 431 (36.7%) obtained their bachelor's degrees from the college within six years while 744 (63.3%) did not. Chart 1 shows the distribution of the persistence. After the first year, 239 students did not return, which is almost a 20% first-year attrition rate for the cohort. Five students left the college after the first year but managed to return and complete their degrees. Another five percent of the cohort (n=60) remained in the college where they had begun six years earlier.

Descriptive Analyses

The Chi-square analysis identified several factors that significantly differentiate the graduated from the not-graduated in each set of the variables (Tables 1, 2, and 3). Table 1 indicates that females are more likely to complete their college degrees than their male counterparts. Those who were among the top 20% in high school grade point averages (GPAs) are more likely to graduate from the college (75.9%). In addition, students who first entered college at an older age or did not attend college immediately after graduating from high school are less likely to persist.

The factors of first-year academic experience and performance also significantly differentiate the graduated from the not-graduated (Table 2). As reported in Table 2, where GPA was converted from numeric format into the ordinal letter grades, more than one-third of those graduated took 14 or more credit hours (12 hours is the minimum to be a full-time student) compared to only one fifth for the not-graduated. Almost 69% of the graduated group received grades of A or B while more than 52% of the not-graduated group had grades of C or D. The

majority of the graduated students did not take remedial courses (78.3%) and did not fail any course (68.8%) during the first year; meanwhile a third of not-graduated students took at least one remedial course and/or had at least two failed courses. Therefore, a student who had a better first year grade, took fewer remedial courses, failed fewer courses, and earned more credit hours in the freshman year was more likely to graduate from the college.

The cohort experienced things that were associated with institutional policies and social economic background. Such experience might contribute to college persistence (Table 3). More than one in every five students who enrolled in the EOP program ended up not graduated while 85% of those who entered the college through general admission graduated. No significant differences exist between graduated and not-graduated group in terms of choice of major commitment or dormitory residency.

Hypothesis Test

The rationale behind choosing the logistic analysis is the dichotomous nature of the dependent variable. In modeling, Pearson correlation analysis was performed to help select the quantitative components entering the regression model for hypothesis test. Instead of using first year grades in letters, the numerical first year GPA was included in the logit model.

Each of the categorical independent variables was re-coded into dummies in order to capture the information contained in a categorization scheme. This information was then used in a standard regression estimation (Hardy, 1993). The number of dummies that can be created from a categorical variable must be the number of categories minus one. Omitting one category is to secure the mutual exclusiveness and exhaustiveness among the categories.

Three logistic models were applied to test if any factors from each set of the predictors, i.e., the pre-entry attributes, the first year academic performance, and the institutional experience, significantly contributed to degree pursuit. Results of the analyses are reported in Table 4A. The parameter estimates (Table 4A) are the logit coefficients, which indicate the directions of the relationships between each pair of independent variable and the dependent variable respectively. The Wald χ^2 is a test statistic of the individual null hypotheses. The significance level specified with the Wald χ^2 tells whether an independent variable is significantly related to the dependent variable. The estimated odds ratio is the exponent of the parameter estimate, which interprets the magnitude of logit odds. The Model χ^2, also called the maximum likelihood function statistics, or –2 log L, tests the joint effect of the explanatory variables included in the model indicating how well the estimates for the parameters in the model fit the data. However, the Model χ^2 has little judgment on the validity of the model (Cabrara, 1994; SAS, 1990).

As reported in Table 4A, being male is negatively related to graduation status with statistical significance among the pre-entry attributes. This means that the males of 1995 cohort were less likely to graduate than their female counterparts. The odds ratio of male is 0.666, meaning that the odds for the male students to graduate are 66.6% as they are for the female students. The Model χ^2 is significant at 0.05 level.

First year cumulative GPA is positively and significantly related to graduation status among the first year academic performance factors (Table 4A). The better the first year

cumulative GPA is, the more likely students would persist. The odds ratio for the variable is 8.658, showing that the odds for students with higher first year cumulative GPA to graduate is more than eight times higher than they are for the students who had lower cumulative GPA in the first year. The Model χ^2 is significant at 0.001 level.

As for the institutional experience factors, enrollment in the EOP program has a negative relationship with graduation (Table 4A). The students enrolled in a special program, such as EOP, had a lower probability of graduating. The odds ratio of 0.665 means the odds to graduate for the EOP students are about two thirds as good as they are for the students entering through general admission. The Model χ^2 is not significant at 0.05 level.

Not all of the three models have a significant logistic model test (Table 4A). The –2 log likelihood indicators (17.712, 707.505, and 7.005 respectively) showed the model data fitness at different levels. The larger the indicator, the higher the statistical significance level, the better the data fit into the model test. The model for the 1st year academic performance has the maximum likelihood of data fit among the three in Table 4A.

In summary, the three logistic model tests have identified several factors that contributed to college persistence at statistically significant levels. Compared to the male students, females were more likely to persist. Students who were not admitted into special education programs were more likely to pursue college degrees than those who enrolled in the EOP program. Moreover, the first year cumulative GPA contributed significantly to college degree completion. The hypotheses of the study were thus partially accepted.

An additional logit model test was conducted in an attempt to investigate the aggregate effect of those factors on college persistence. All the independent variables were gathered and entered into one logistic model against the dependent variable, six-year graduation status. The results are reported in Table 4B. Four factors are found to significantly contribute to persistence, including male gender (negative) and first year GPA (positive). Hispanic students are 2.9 times as likely to persist compared to the non-Hispanic in general. For students with one more failed course during the first year, the odds of graduation are 72.6% as good as they are for those students with one less failed course. By and large, the results from the aggregate model support the findings from the individual hypothesis tests.

The study went one step further to examine the group of students in the cohort who did not obtain their degrees at the end of the sixth year but still enrolled for their seventh college year (n=60). These students might have been out of the school for one or more semesters during their first six years. Table 5 summarizes the characteristics of this group and compares them with that of the graduated group. As it shows, females accounted for 62% of the still-enrolled group and 82% were white. About 13% of them were admitted into EOP in 1995. Among the first-time, full-time cohort who entered the college in 1995, 87% graduated from high school in the same year. During their first college year, 80% did not take any remedial courses, but more than half of them failed at least one course. This group had higher average total SATs than that of the graduated group. All the still-enrolled had one thing in common; that is, for whatever the reason, they took their own pace marching towards the graduation.

Implications and Limitations

The findings of the study indicate that good academic performance in the first year is a positive factor impacting persistence. Taking fewer remedial courses implies a better pre-college preparation. Maintaining a GPA of 2.0 and above not only allows a student to claim an academic major and receive further financial assistance from EOP, but also assures the college path in front of his/her: you can do it! However, the GPA does not take into account withdrawals and/or incompletes at the end of the first college year, and one should exercise caution while interpreting the scores. With the impact of GPA on persistence, it is equally important for college administrators to look into the grades integrity and processing of it rather than merely reading the scores.

The study also found that female students were more likely to persist than male students in the college. The female students account for 59.3% who completed college within six years. From the literature, the weight of evidence is clear, because ability and socioeconomic status made women likely to be over-represented in the fields of education, social work and social sciences (for example, Jacobs, 1986; Polachek, 1978). Therefore, it is not surprising to find the higher persistence level for females, since the college in this study offers more than half of its programs in education and is the first NCATE (National Council for Accreditation of Teacher Education) accredited institution in the state university system.

The implication of the results from EOP students' persistence has to be cautious. On the campus of the study, students enrolled in the EOP program receive more academic assistance than the regular students, and they have regular meetings with their academic counselors every other week. The campus reality indicates that enrollment in the EOP program was not the reason that students failed to pursuit in college, but more likely the academic under-preparation.

While the 1995 cohort study gave a broad view of the whole period of six college years, it focused on the first college year and the completion of a bachelor's degree only. As the study revealed that more than 58% of the 1995 cohort did not graduate and did not enroll any longer after six years, it is almost certain that other factors impact students' persistence and their departure after the first year in college. Many speculations have arisen that the mid-90's good job market and the college's metropolitan surroundings pulled students away from the campus, but no statistics are available to support the claims. The data also lack information on the students who transferred to other schools to pursue college degrees, which caused unwillingly the blend of the institutional withdrawal with the dropout. The National Student Clearinghouse's Enrollment Search database offers a new way to track the subsequent enrollment of those who left the college without a degree. To generalize the results, more work has to be done to explore the trend of the first year experience that impacts college persistence.

The use of campus data often encounters the problem of data limitation. For this study, the model tests were limited to the availability of the data. Some of the variables that might have contributed to college persistency according to the literature were not available, e.g., financial aid, student satisfaction, etc. Some data defects, such as missing information for the SAT scores and the dormitory residency variables, were noticed but beyond the control of the IR office, that maintains the campus data. Nevertheless, to IR practitioners, those data are still full of details,

campus oriented, and suitable to serve various campus projects. However, use them with great caution.

The results of the study suggest that further studies may consider discarding the assumption of linear effect of predictors on college persistency. Using a non-linear model to prescribe the regression may produce a more realistic curve than applying linear perfection. Checking out the non-linear effects of predictors can be done through examining the specific odds level of the variables.

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Chart 1. Distribution of College Persistence for 1995 Cohort

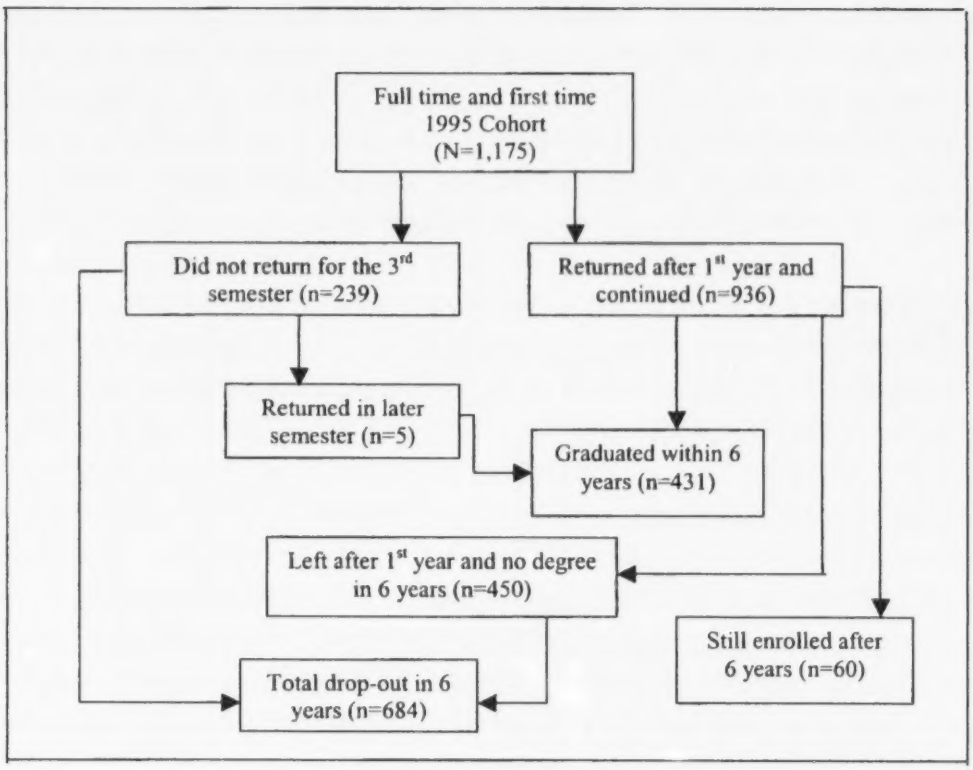
Full time and first time 1995 Cohort (N=1,175)
Did not return for the 3rd semester (n=239)
Returned after 1st year and continued (n=936)
Returned in later semester (n=5)
Graduated within 6 years (n=431)
Left after 1st year and no degree in 6 years (n=450)
Still enrolled after 6 years (n=60)
Total drop-out in 6 years (n=684)

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Table 1. Graduated and Not-Graduated on Pre-Entry Attributes

Variable	Graduated (n=431)		Not-Graduated (n=744)		χ^2
	n	% within group	n	% within group	
Gender					7.574**
Female	278	64.5	419	56.3	
Male	153	35.5	325	43.7	
Age (1995)					14.735**
Less than 18	98	22.7	145	19.5	
18-19	315	73.1	546	73.4	
20 & up	18	4.2	53	7.1	
Ethnicity					0.064
Asian	11	2.6	26	3.5	
Black	52	12.1	137	18.4	
Hispanic	19	4.4	32	4.3	
White	322	74.7	495	66.5	
Others	27	6.3	54	7.3	
High School Avg.					18.994***
90+	37	8.6	37	5.7	
80-89	290	67.3	437	58.7	
70-79	70	16.2	172	23.1	
65-69	34	8.0	93	12.5	
Total SATs					2.735
1000 +	59	16.7	78	14.4	
800-899	172	48.6	261	48.2	
799 or Less	123	34.8	203	37.5	
HS Graduation Yr					12.256***
1995	399	92.6	638	85.8	
1994 or Earlier	32	7.4	106	14.3	

$p < .05$*, $p < .01$**, $p < .001$***

Table 2. Graduated and Not-Graduated on First Year Academic Performance

Variable	Graduated (n=431)		Not-Graduated (n=744)		χ^2
	n	% within group	n	% within group	
1st Sem. Registered Hr					31.621***
Less than 14	271	62.9	578	77.7	
14 or More	160	37.1	166	22.3	
1st Yr Cum. Grade					54.855***
A	57	13.4	34	6.7	
B	236	55.4	209	41.0	
C	129	30.3	231	45.3	
D	4	0.9	36	7.1	
1st Yr Remedy Course					17.405***
None	336	78.3	399	67.3	
One	40	9.3	89	15.0	
Two or More	53	12.4	105	17.7	
1st Yr Failed Course					106.974***
None	295	68.8	259	43.7	
One	97	22.6	133	22.4	
Two or More	37	28.6	201	33.9	

$p < .05$*, $p < .01$**, $p < .001$***

Table 3. Graduated and Not-Graduated on Institutional Experience

Variable	Graduated (n=431)		Not-Graduated (n=744)		χ^2
	n	% within group	n	% within group	
Admission Type					9.06*
General	370	85.8	590	79.3	
EOP	61	14.2	154	20.7	
Committed Major, 1st Yr					3.561
Yes	166	38.5	246	33.1	
No	265	61.5	498	66.9	
1st Sem. Live in Dorm					0.993
Yes	171	39.7	295	39.6	
No	260	60.3	449	60.4	

$p < .05$*, $p < .01$**, $p < .001$***

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Table 4A. Logistic Analysis of First Year Experience on Graduation (N=1,175)

Variable	Parameter Estimate	Wald χ^2	Odds Ratio
Pre-Entery Attributes			
Intercept			
Age	-0.0380	0.4014	0.963
High School GPA	0.0022	0.3393	1.002
Total SATs	0.0007	3.1100	1.001
HS Grad. in Same Year	0.1204	0.1298	1.128
Male	-0.4066	8.0798**	0.666
Asian	0.3150	1.0893	1.370
Black	-0.2757	0.2688	0.759
Hispanic	0.0430	0.0134	1.044
White	0.5938	1.6689	1.811
	Model χ^2	17.712*	
	d.f.	9	
1st Year Acad. Performance			
Intercept			
Cumulative GPA	2.1585	109.0790***	8.658
# of Failed Course	0.2219	3.4542	1.248
# of Remedial Course	-0.3015	6.3028	0.740
	Model χ^2	707.505***	
	d.f.	3	
Institutional Experience			
Intercept			
Committed a major	0.0823	0.3567	1.086
Enrolled in EOP	-0.4084	5.0166*	0.665
Lived in Student Dorm	0.0066	0.0096	1.007
	Model χ^2	7.005	
	d.f.	3	

$p < .05$*, $p < .01$**, $p < .001$***

Table 4B. Logistic Analysis of First Year Effects on Graduation (N=1,175)
(Aggregate Effect)

Variable	Parameter Estimate	Wald χ^2	Odds Ratio
Intercept			
Age	-0.1619	4.2821	0.851
High School GPA	-0.0221	0.2343	0.998
Total SATs	-4.99-E6	0.0001	1.000
HS Grad in Same Year	-0.1612	0.1668	0.851
Male	-0.3729	5.5478*	0.689
Asian	-0.1215	0.0419	0.886
Black	0.1375	0.1054	1.147
Hispanic	1.0630	3.6963*	2.895
White	0.2082	0.3652	1.232
Cumulative GPA	0.6642	18.5740***	1.943
# of Failed Courses	-0.3198	9.5264***	0.726
# of Remedial Courses	-0.0213	0.0131	0.979
Committed a major	-0.0520	0.1070	0.949
Enrolled in EOP	-0.4870	1.1974	0.614
Lived in Student Dormitory	-0.1210	2.1890	0.886
	Model χ^2	121.25***	
	d.f.	15	

$p < .05$*, $p < .01$**, $p < .001$***

Table 5. A Brief Look at Students Not-Graduated but Still Enrolled (after six years in college)

Variable	Not-Graduated but Enrolled (n=60)		Graduated (n=431)	
	n	% in group	n	% in group
Gender				
Female	37	61.7	278	64.5
Male	23	38.3	153	35.5
Ethnicity				
White	49	81.7	322	74.7
Black	7	11.7	52	12.1
Others	4	6.8	57	11.2
Admission Type				
General	52	86.7	370	85.6
EOP	8	13.3	61	14.5
HS Graduation				
1995	52	86.6	399	92.6
1994 & earlier	8	13.4	32	7.4
1st Yr Remedial Taken				
None	43	79.6	336	78.3
1 course	8	14.8	40	9.3
2 & more courses	3	5.4	53	12.4
1st Yr Failed				
None	24	44.4	295	6.8
1 course	20	37.0	97	22.6
2 & more courses	10	18.6	37	8.6
Mean Scores	Mean	s.d.		
Age	23.9	1.0	18.5	2.5
High School Average	77.6	21.1	77.2	23.0
Total SATs	874.0	138.0	838.0	186
Cumulative Credit Hr	94.3	35.5	130.7	18.2
Cumulative GPA	2.7	0.5	2.8	0.4

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